

Claims

- [c1] 1. An apparatus for MRI, comprising:
an RF birdcage coil having a coil axis, an end ring portion disposed about the axis, and a plurality of legs disposed parallel to the axis and in signal communication with the end ring portion; and
an RF shield disposed about the coil and in signal communication therewith, the shield comprising a cylindrical conductive sheet having first and second ends, a plurality of sets of discontinuous slots disposed about the cylindrical sheet and running between the first and second ends, wherein a region of discontinuity within a set of the slots aligns with the end ring portion.
- [c2] 2. The apparatus of Claim 1, wherein the region of discontinuity has an axial length equal to or greater than the width of the end ring portion.
- [c3] 3. The apparatus of Claim 2, wherein the region of discontinuity has an axial length equal to or greater than about two times the width of the end ring portion.
- [c4] 4. The apparatus of Claim 1, wherein the number of sets of discontinuous slots is equal to or greater than the

number of legs.

- [c5] 5.The apparatus of Claim 1, wherein the sheet comprises a material having an electrical conductivity equal to or greater than about 2% and equal to or less than about 20% the electrical conductivity of pure copper.
- [c6] 6.The apparatus of Claim 1, wherein the sheet comprises a mesh.
- [c7] 7.The apparatus of Claim 6, wherein the mesh comprises a copper alloy.
- [c8] 8.The apparatus of Claim 7, wherein the coil has a Q-factor equal to or greater than about 50% of the Q-factor if the sheet were made of solid copper having a thickness of equal to or greater than about three times the skin depth at the Larmor frequency of protons.
- [c9] 9.The apparatus of Claim 6, further comprising a gradient coil disposed about the RF coil, wherein the mesh is embedded in epoxy at the gradient coil.
- [c10] 10.The apparatus of Claim 9, wherein the region of discontinuity has an axial length equal to or greater than about two times the width of the end ring portion.
- [c11] 11.The apparatus of Claim 1, wherein the plurality of sets of slots are disposed between the plurality of legs.

- [c12] 12.The apparatus of Claim 11, wherein the plurality of sets of slots are equally spaced.
- [c13] 13.The apparatus of Claim 1, wherein the RF shield further comprises an integrally formed capacitor running lengthwise between the first and second ends, the capacitor being disposed only partially around the circumference of the cylindrical sheet.
- [c14] 14.An apparatus for MRI, comprising:
means for generating a gradient field;
means for generating an RF field; and
means for RF shielding the gradient field generating means;
wherein the RF field generating means has Q-factor equal to or greater than about 50% of the Q-factor if the RF shielding means were made of a solid copper sheet having a thickness of equal to or greater than about three times the skin depth at the Larmor frequency of protons.
- [c15] 15.The apparatus of Claim 14, wherein:
the means for RF shielding comprises means for conducting eddy currents induced by the means for generating an RF field.
- [c16] 16.The apparatus of Claim 15, wherein:

the means for RF shielding comprises means for blocking eddy currents induced by the means for generating a gradient field.

- [c17] 17. An apparatus for MRI, comprising:
- an RF birdcage coil having a coil axis, an end ring portion disposed about the axis, and a plurality of legs disposed parallel to the axis and in signal communication with the end ring portion; and
 - an RF shield disposed about the coil and in signal communication therewith, the shield comprising:
 - a cylindrical copper alloy mesh sheet having first and second ends, a plurality of sets of discontinuous slots disposed about the cylindrical sheet and running between the first and second ends, wherein a region of discontinuity within a set of the slots aligns with the end ring portion; and
 - an integrally formed capacitor running lengthwise between the first and second ends, the capacitor being disposed only partially around the circumference of the cylindrical sheet.